Injury Trends in Irish Amateur Rugby: An Epidemiological Comparison of Men and Women

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Abstract

Background:

Rugby Union is a physically demanding sport that carries an inherent risk of injury. Despite being a popular and widely played team sport, little is known about injuries occurring across the male and female amateur game.

Purpose:

To establish and compare injury incidence, nature and severity in male and female Irish amateur Rugby Union.

Study Design:

Prospective cohort study.

Level of Evidence:

Level 3

Methods:

Data were collected prospectively from 25 male teams (959 players) and eight female teams (234 players) over two full seasons. Both time-loss (24-hour time-loss injury definition) and non-time-loss match injuries were collected, alongside match exposure data.

Results:

Time-loss match injury incidence rates were 49.1/1 000 and 35.6/1 000 player hours for males and females respectively. Concussion and ankle ligament sprains were the most common diagnoses for males (5.6/1 000 player hours and 4.4/1 000 player hours respectively) and females (5.5/1 000 player hours and 3.9/1 000 player hours respectively). Anterior cruciate ligament injuries presented the highest injury burden for males and females with 200.3 days absence and 307.2 days absence per 1 000 player hours respectively. In females, 83% of non-contact injuries occurred in the 4th quarter of match play.

Conclusion:

While female players had a lower overall injury incidence rate compared to males, concussion and ankle ligament injuries were the most common injuries in both cohorts. In females, a high rate of non-contact injuries in the second half point to the need for strength and conditioning training programs to reduce fatigue-related injuries.

Clinical Relevance:

Establishing the incidence and burden of rugby-related injuries is an essential step in minimising injury risk. This epidemiological information will aid the development of future reduction strategies, including education and coaching strategies and strength and conditioning programmes, informed by the most common injuries observed and the mechanism of injury.

Key Words:

Rugby Union; Injury Risk; Epidemiology; Injury Surveillance; Injury Prevention

Introduction

Rugby Union, hereafter 'rugby', is an increasingly popular team sport characterised by both high and low intensity activities alongside exposure to collisions and contact events.[22, 32] As with most sports, the majority of participants are amateur with approximately 9.6 million rugby players currently registered across 123 countries worldwide and female players accounting for nearly 30% of all players.[2, 33]

The incidence of rugby-related injury varies from 46.8/1 000 to 81/1 000 player hours in the amateur and professional men's game respectively[30, 35] however, there is a lack of similar research conducted in the female game.[29, 18] To effectively manage injury risk, comprehensive injury surveillance must be conducted across all levels, to identify injury mechanisms and associated risk factors.[15, 16] In the current literature, differences in injury definition, reporting and methods of data collection make comparisons between studies difficult and subsequently affects the design and implementation of effective injury reduction strategies.[18, 35] In an attempt to manage the risk of rugby-related injury World Rugby have established a transparent and standardised approach to surveillance and reporting, resulting in comprehensive surveillance conducted at international or elite-level competitions.[12] Across all levels of the game, a 24 hour time-loss injury definition has been recommended[10] however, due to limited resources and medical personnel in the amateur setting this may not be achievable and therefore a >7 day time-loss ('missed-match') injury definition may be used.[4] This 'missed-match' definition has resulted in a lower injury rate of 22.8/1 000 player hours reported in the senior male amateur game in comparison to 46.8/1 000 player hours reported in a meta-analysis on amateur rugby.[23, 35] By only reporting injuries resulting in a >7 day time-loss overall injury occurrences may not be accounted for and may result in under-diagnosis of minor injuries (e.g. minor strains/sprains and lacerations/contusions) and injury recurrences.[8] While these injuries may not result in lengthy absences from matches and/or training, cumulatively throughout the season they may result in a high injury burden to the player and team overall.[24] Therefore, comprehensive

injury surveillance, using a 24 hour time-loss injury definition is required, to more accurately reflect the incidence of all injuries.

While injury surveillance has been conducted in some amateur male rugby cohorts, it is often limited to elite-level competitions in the female game with no long-term prospective surveillance strategy in the amateur setting until recently.[29, 34] A pooled incidence rate of 19.6/1 000 player hours has been reported in the female game,[18] which is lower than rates reported in meta-analyses in the professional and amateur male game.[30, 35] This pooled incidence rate included injuries from elite competitions, collegiate and national teams, with the only study reporting on the senior amateur female game excluded due to methodological differences in study design and injury reporting.[3] While potential sex-related differences in both incidence rates and injury patterns have been recently highlighted,[29] due to a lack of long-term surveillance strategies in amateur female rugby these differences have yet to be investigated further. Therefore, determining injury risk based on the currently available evidence may not accurately reflect potential differences between males and females. These potential sex-related differences may influence the subsequent design and implementation of injury prevention strategies, as these strategies may need to be adapted based on differences in injury characteristics.[2, 29] Therefore, the aim of this study was to describe the incidence, nature and severity of injuries resulting from match-play within Irish male and female amateur rugby.

Methods

This prospective cohort study was conducted over two full rugby seasons, running from July 2017 to May 2019. In Ireland, there are approximately 209 000 players currently participating from 224 amateur rugby clubs (130 male clubs, 94 male and female clubs).[33] There is a national league of 58 clubs called the All Ireland League (AIL) representing the highest level of amateur rugby in Ireland. The men's AIL comprises 50 teams across two main divisions (Division 1 and Division 2); while the women's AIL comprises eight teams in one single division. Twenty-one clubs (16 male clubs, five female clubs) of the 58 AIL clubs were

recruited to participate in the Irish Rugby Injury Surveillance (IRIS) Project for the first season of data collection (2017-2018).[34] In season two (2018-2019), a further 15 clubs (ten male clubs, five female clubs) were recruited, resulting in a total of 26 male clubs and ten female clubs participating. Both Division 1 and Division 2 men's AIL teams were included in both seasons, to provide an accurate representation of playing level within the men's amateur game in Ireland. In the second season, two non-AIL female clubs were recruited and while these two teams played in one division lower than the AIL they would be of similar skill level as they compete each season during the promotion/relegation play-offs for inclusion in the AIL. Ethical approval for this study was granted by the institution's Research Ethics Committee in compliance with the Declaration of Helsinki.

Participants

At the end of the 2016-2017 rugby season, AIL clubs were contacted and invited to participate in the IRIS Project beginning in the 2017-2018 season. An introductory email and letter was sent to the club secretary and medical staff, outlining the aims of the IRIS Project, support from the Irish Rugby Football Union, incentives and commitment required from the club staff, players and medical staff.[34]

An injury recorder was nominated in each participating club to act as the main contact point for the IRIS Project. Where possible, the injury recorder was the primary medical professional working with the senior first team, however some clubs nominated an alternative injury recorder to collect and record injury reports from the match day physiotherapist or doctor. Injury recorders included physiotherapists/physical therapists (n=27), club welfare officers (n=7), doctors (n=1) and team coaches (n=1). Injuries were recorded on a bespoke web-based injury surveillance platform, IRISweb.[34] All senior first squad players were registered on IRISweb, including; player name, date of birth, mass, height, past medical history, medications, past injury history (within the preceding 12 months), playing position and number of years playing rugby.[34] Signed informed consent was obtained from each club, injury recorder and player.

Injury Surveillance

The injury recorder was asked to document any match or training injury occurring in the senior first squad throughout the season, following the World Rugby definition of an injury.[10] Any injury that resulted in a player being unable to fully participate in a future scheduled match or training session for more than 24 hours following the injury was categorised as a time-loss injury. Injuries that did not result in an absence from match or training activities were categorised as non time-loss injuries.[10] Injury data included injury location and nature, time of occurrence and the mechanism.[34] Provisional diagnoses, final diagnoses and number of days' absence from rugby matches and/or training were also recorded. Absences from rugby match play or training due to illness or injuries incurred through other activities (outside rugby match or training activities) were not included. During the season, the main author (CY) conducted a weekly audit of the data collected to ensure accuracy and completeness.[34] All injuries were recorded within 30 days after the last match of the season to give sufficient time to report and clear injuries as appropriate.

Statistical Analysis

Descriptive statistics, including; mean ± standard deviation (SD), median (interquartile range), number and percentages, were used to summarise participant demographics and anthropometrics using SPSS (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Data were analysed and presented separately for males and females. Injury incidence rates for all match injury variables were calculated according to the following equation:[10]

$$\text{Incidence Rate} = \frac{\text{number of injuries}}{\text{number of matches x number of players (15) x match duration (1.33)}} \text{ x 1 000}$$

Using this equation, match exposure was based on 15 players being exposed for 80 minutes. Logistic regression was used to obtain rates of injuries with 95% confidence intervals (CI). Overall injury incidence rates were reported individually for each season to highlight potential benefits of continued seasonal prospective surveillance strategies, however all other variables were reported for both seasons combined. Injury severity was reported as the median (inter-quartile range) days' absence. In order to compare to

current literature in amateur rugby, injuries in the current study that resulted in >7 days absence were also reported separately.[4, 10] Match injury burden was calculated as days lost per 1 000 player hours to provide an overview of risk.[1]

Results

In season one, 21 clubs (16 male clubs, five female) were recruited to participate in the IRIS Project, with two clubs (one male club, one female) failing to give a full season of data and were therefore excluded from analysis. These two clubs agreed to participate in the second season of data collection, alongside a further 15 clubs (ten male clubs, five female clubs). Four of these 36 clubs were excluded at the end of the second season, with one club (female) withdrawing from competitive rugby mid-season and the three other clubs (one male club, two female) failing to provide a full season of data. This resulted in an overall compliance rate of 90% over the two seasons. A total of 959 male players (mean ± SD of 38 ± 8 players per team) and 234 female players (mean ± SD of 29 ± 13 players per team) were registered over the two seasons and monitored for match injuries (Table 1).

Table 1: Player background information summarised by number or mean ± SD

	MALE PLAYERS		**FEMALE PLAYERS**	
Total player numbers	959		234	
Number of clubs	25		8	
Age (years)	25.1 ± 4.1		27.2 ± 5.3	
Rugby playing experience (years)	14.4 ± 4.7		5.8 ± 4.3	
Division experience (years)	2.8 ± 2.7		2.8 ± 2.9	
	Forwards	*Backs*	*Forwards*	*Backs*
Total player numbers	533	426	129	105
Mass (kg)	103.4 ± 11.9	85.7 ± 7.8	80.1 ± 14.7	67.6 ± 8.7
Height (cm)	185.7 ± 7.4	180.2 ± 6.6	169.4 ± 7.8	164.8 ± 7.5

Match Injury Incidence

Over two seasons, a total of 1 073 injuries were recorded across 1 080 matches, with overall time-loss (>24 hour absence) match injury incidence rates of 49.1/1 000 player hours and 35.6/1 000 player hours for males and females respectively (Table 2).

Each male team competed in 23 ± 2.6 matches in season one, while the female teams competed in 20 ± 1.9 matches. In season two, each male team competed in 22 ± 1.5 matches, however the female teams had fewer matches compared to season one competing in 15 ± 1.6 matches. Across both seasons, males had a higher injury prevalence with 51% sustaining at least one injury compared to 37% of females and 19% of males sustained more than one injury, compared to only 10% of females.

Location and Nature of Time-loss Match Injuries

The head and face was the most common location for time-loss injuries for males and females with respective incidence rates of 7.6/1 000 player hours and 6.9/1 000 player hours, however injuries to the shoulder (males) and knee (females) resulted in lengthier absences from matches and/or training (Table 3). The majority of head and face injuries occurred in the forwards for both the males (4.6/1 000 player hours) and females (3.6/1 000 player hours).

Males had a higher incidence of muscle and tendon strains compared to females, with respective incidence rates of 14.9/1 000 player hours and 6.4/1 000 player hours, whereas females sustained more ligament sprains overall (Table 4). Incidence rates and injury severity for all bodily locations and injury types can be found in the supplementary tables (S1-5). Forwards sustained the majority of injuries compared to backs in both the male (60%) and female (55%) teams. In the male teams, the loose-head prop had the highest injury rate of the overall, with a rate of 5.1/1 000 player hours, whereas the inside centre had the highest injury rate in the female teams (5.8/1 000 player hours).

Table 2: Match injury incidence rates for seasons one, two and both seasons combined

MALE

Injury definition	Season	Number of Injuries	Exposure Hours[†]	IR[‡] (95%CI)
>1 day time-loss	*Season 1*	344	6 800	50.6 (45.2-55.9)
	Season 2	538	11 180	48.1 (44.0-52.2)
	Total	**882**	**17 980**	**49.1 (46.1-52.7)**
>7 day time-loss[§]	*Season 1*	261	6 800	38.4 (33.7-43.0)
	Season 2	423	11 180	37.8 (34.2-41.4)
	Total	**684**	**17 980**	**38.0 (35.4-41.2)**
Non time-loss	*Season 1*	16	6 800	2.4 (1.2-3.5)
	Season 2	38	11 180	3.4 (2.3-4.5)
	Total	**54**	**17 980**	**3.0 (2.2-3.8)**

FEMALE

Injury definition	***Season***	Number of Injuries	Exposure Hours [†]	IR[‡] (95%CI)
>1 day time-loss	*Season 1*	72	1 560	46.2 (35.5-56.8)
	Season 2	57	2 060	27.7 (20.5-34.8)
	Total	**129**	**3 620**	**35.6 (29.9-41.7)**
>7 day time-loss[§]	*Season 1*	55	1 560	35.3 (25.9-44.6)
	Season 2	43	2 060	20.9 (14.6-27.1)
	Total	**98**	**3 620**	**27.1 (21.7-32.4)**
Non time-loss	*Season 1*	8	1 560	5.1 (1.6-8.7)
	Season 2	0	2 060	0
	Total	**8**	**3 620**	**2.2 (0.7-3.7)**

[†]Exposure hours: calculated based on 15 players on the pitch for an 80minute match.[12]

[‡]IR: Incidence rates per 1 000 player hours (95% confidence intervals).

[§]>7 day time-loss also reported as per the community rugby injury surveillance guidelines.[5]

Time-loss Match Injury Diagnosis and Burden

Concussion injuries were the most common time-loss injury diagnosis for males (5.6/1 000 player hours) and females (5.5/1 000 player hours), with 56% of male concussions and 45% of female concussions occurring as a result of tackling the ball carrier. Anterior cruciate ligament (ACL) ruptures carried the highest injury burden for both males and females resulting in a total 200.3 days absence per 1 000 player hours and 307.2 days absence per 1 000 player hours respectively.

Table 3: The three most common injury locations for seasons one and two combined

	Injury Location	IR[†] (95% CI)	Severity[‡] (Median, IQR)
Male	Head/face	7.6 (6.4-8.9)	21 (21-27)
	Shoulder	7.5 (6.3-8.8)	22 (7-43)
	Ankle	6.0 (4.9-7.2)	21 (8-41)
Female	Head/face	6.9 (4.2-9.6)	21 (21-28)
	Knee	6.1 (3.5-8.6)	36 (11-87)
	Ankle	5.2 (2.9-7.6)	20 (11-73)

[†]IR: Incidence rate per 1 000 player hours (95% CI).
[‡]Severity: median days absence per injury (median & interquartile range)

Table 4: Top three most common injury types for seasons one and two combined

	Injury Type	IR[†] (95% CI)	Severity[‡] (Median, IQR)
Male	Strains	14.9 (13.1-16.7)	15 (7-29)
	Sprains	12.2 (10.5-13.9)	22 (10-41)
	Haematoma/contusions	6.6 (5.4-7.8)	9 (7-21)
Female	Sprains	14.1 (10.2-18)	14 (8-35)
	Strains	6.4 (3.8-9)	10 (4-19)
	Concussions	5.5 (3.1-7.9)	21 (21-28)

[†]IR: Incidence rate per 1 000 player hours (95% CI)
[‡]Severity: median days absence per injury (median & interquartile range)

Table 5: The three most common injury diagnoses for seasons one and two combined

	Injury Diagnosis	IR[†] (95% CI)	Severity[‡] (Median, IQR)
Male	Concussion	5.6 (4.5-6.7)	21 (21-28)
	ATFL[§] sprains	4.4 (3.9-6.0)	15 (7-35)
	Hamstring strains	4.2 (3.3-5.2)	21 (14-35)
Female	Concussion	5.5 (3.1-7.9)	21 (20-32)
	ATFL[§] sprains	3.9 (1.8-5.9)	15 (8-21)
	MCL[¶] sprains	2.8 (0.9-4.5)	35 (21-49)

[†]IR: Incidence rate per 1 000 player hours (95% CI)
[‡]Severity: median days absence per injury (median & interquartile range)
[§]ATFL: Anterior talo-fibular ligament (ankle)
[¶]MCL: Medial collateral ligament (knee)

Timing and Mechanism of Time-loss Match Injury

Pre-season training began in July-August, with AIL matches beginning in September and ending in April (females) or May (males). The majority of injuries reported occurred in the early part of the season (September to November), accounting for 47% and 56% of all male and female injuries respectively (Figure 1). Muscle and tendon strains and ligament sprains had a highest occurrence during these months for females (62% and 60% respectively) compared to males (48% and 40% respectively). These months also resulted in the majority of reported fractures for males (53%) and females (56%). While 52% of joint dislocation/subluxations occurred during the September to November period for males, 75% of dislocation/subluxations occurred later in the season for females (December to February).

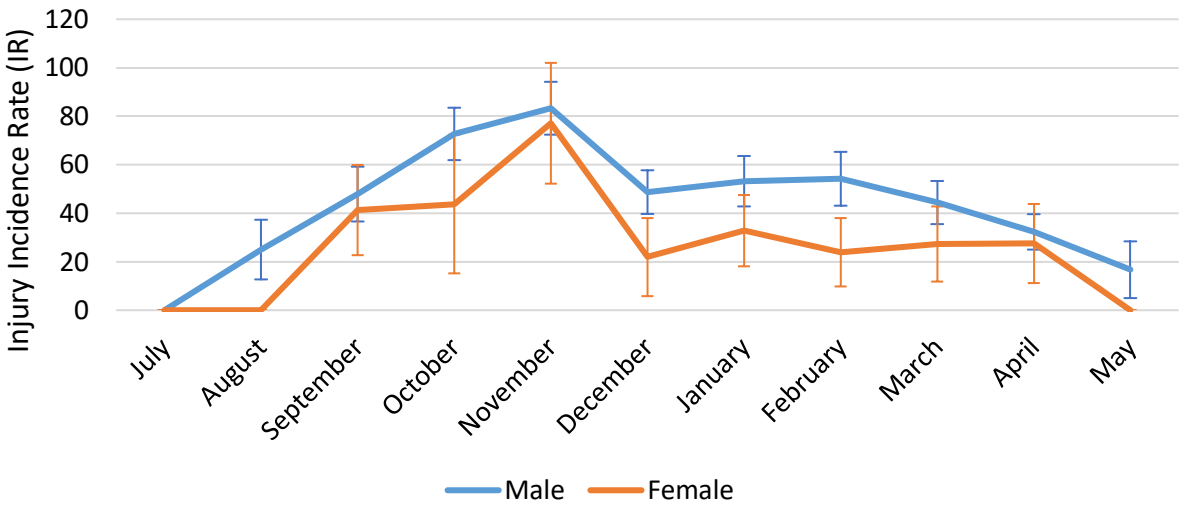

Figure 1: Seasonal variation of match injury occurrence for seasons one and two combined (IR/1 000 player hours)

During match play, females had a high incidence of injury in the second quarter, which plateaued out across the third and fourth quarters (Figure 2). In comparison, the male players had a peak of injury occurrence in the third quarter. The fourth quarter of match play resulted in the majority of non-contact injuries in females (83%) compared to males (30%). The tackle event accounted for the majority of injuries for males and females, with 59% (males) and 61% (females) of tackle-related injuries occurring in the third and fourth quarters combined. Injuries occurring due to tackling or being tackled resulted in the same incidence rate for males (14.3/1 000 player hours), however being tackled resulted in more injuries than tackling in females (11.9/1 000 player hours versus 8.8/1 000 player hours). This was followed by non-contact injuries in males (5.1/1 000 player hours) and ruck-related injuries in females (6.1/1 000 player hours).

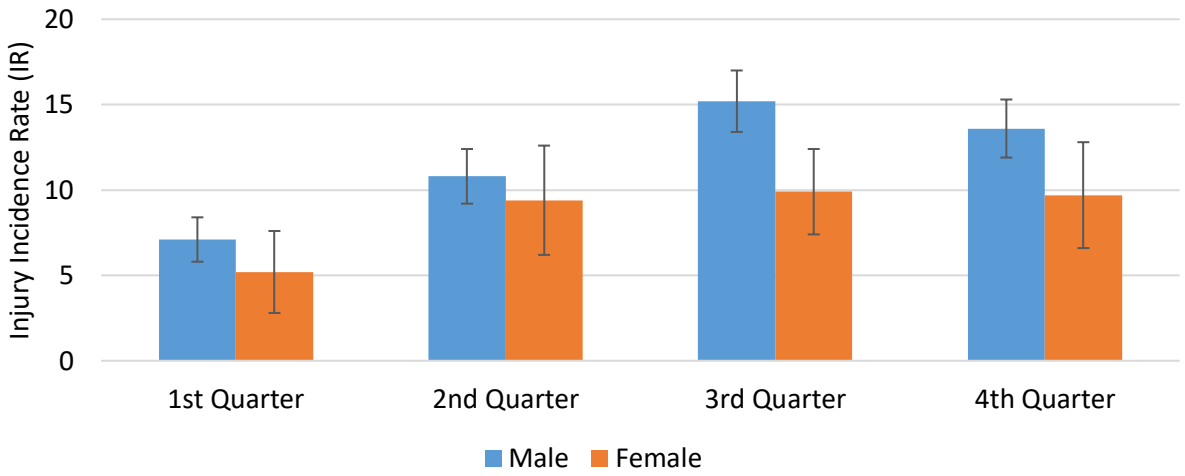

Figure 2: Timing of injury during match play for seasons one and two combined (IR/1 000 player hours)

Discussion

This study aimed to establish the incidence of injuries in Irish amateur rugby, and compare the incidence, nature and severity of injuries in senior male and female amateur rugby, over two seasons. The high compliance rate of participating clubs allowed for both time-loss and non time-loss injuries to be recorded and monitored for accurate injury rates and severity measured as total days' absence.

Incidence Rates

Incidence rates in both seasons for males were similar to the pooled incidence rate previously reported in the amateur game (46.8/1 000 player hours)[35] and lower than professional male players (81/1 000 player hours).[30] However, these rates were higher than previous studies in amateur male rugby (22.8/1 000 player hours), which may be due to the different injury definitions used.[23] Following the recent policy statement from World Rugby,[4] injury incidence rates in the current study were also reported using a >7 day time-loss injury definition and the resultant rate of 38/1 000 player hours remained high in comparison to other research. This may be due to the cohorts used, as the current study used a sample of amateur rugby players from the highest level of amateur play within Ireland, while the cohort used in the Rugby Football Union Community Rugby Injury Surveillance Project (RFU CRISP) includes semi-

professional, amateur and recreational players.[23] Injury rates may increase with increased levels of competitiveness[30] and therefore using the highest level of amateur players in Ireland may account for the higher incidence rate found here.

A decrease in injury incidence was found for the females during the second season in comparison to season one. The IRIS Project is the first longitudinal study to investigate injuries in the amateur female game using a 24 hour time-loss injury definition, and therefore understanding the observed differences in injury rates between males and females over two seasons is a challenge. One possible explanation for the lower injury rate found in females may be due to physiological and anatomical differences between sexes.[26, 29] Player acceleration and tackler speed increases injury risk, and as female players may have lower levels of speed and power compared to males, this may influence the forces experienced by players during a tackle-event.[7, 26] Another explanation may have been the number of matches played during the AIL season. In season two the female teams had fewer matches in the AIL as one team withdrew from competitive rugby, resulting in less match congestion and longer rest periods between matches.[6]

Timing of Injury

Similar to the literature on professional rugby, the third quarter (40-60 minutes) of match play had the highest occurrence of injury for males[30] and this may be due to incomplete warm-up at half time, reduced concentration following the break in match play or the introduction of substitute players.[20, 30] Due to physiological differences observed in females, lower levels of strength and power may result in lower aerobic endurance capacity, particularly leading in to the half-time break may have resulted in the high rate of injuries reported in the second quarter.[20, 25] All non-contact injuries in the female players occurred in the second half of match play (third and fourth quarters) which may be due to fatigue as the match progressed,[25] particularly as female teams in the current study had smaller squad sizes and therefore less substitute players to use during the season. In the current study, the highest incidence of injury occurred in the first three months of the playing season (September to November), similar to recent findings in

Rugby League.[9] This may have been due to low levels of participation in pre-season training, inadequate preparation for the upcoming season or potential spikes in training load.[9, 31] However, injury rates tended to increase once again towards the end of the season, likely due to cumulative fatigue, a smaller pool of available players and increased competitiveness during the knock-out phases of the competition.[6, 14, 31] The majority of muscle and tendon strains and ligament sprains in females occurred in the early part of both seasons (September to November), which may be due to inadequate preparation during pre-season or low levels of muscular strength.[9, 14, 17] However in the males, the majority of fractures and dislocations occurred early in the season, perhaps due to a lack of physical robustness, or unrefined tackle technique following the off-season period.[31] Further monitoring of these trends may highlight areas for future injury reduction strategies, focusing on adequate strength and conditioning training and pre-season preparation.

Injury Diagnosis and Burden

Concussion and ankle ligament sprains were the most common diagnoses for both males and females across both seasons. The majority of concussion injuries were to the tackler, which has been previously reported in the professional men's game.[7] The mechanism of a concussion injury occurring is multi-factorial, with tackle type, player acceleration, tackler speed, fatigue and head contact type found to be influential.[5, 7] Modifications to tackle height has been trialled in an attempt to reduce head injury risk, however the focus has been on the ball carrier and not the tackler.[27, 28] Further investigation into the effect of tackle height on the tackler is required as a potential avenue to reduce the risk of concussions.[7] Correct tackle technique may also contribute to reducing concussion injury risk[7, 11] and therefore the relationship between correct tackle technique and fatigue should be investigated. The majority of tackle-related injuries occurred in the second half of match play, thus player fatigue may influence the tackle technique resulting in an increased risk of injury.[5, 13, 28] Future prevention strategies should incorporate educational

and training strategies for correct tackle technique, in conjunction with appropriate strength and conditioning training to ensure tackle technique is not impacted by player fatigue.[5, 13]

Lower limb injuries are commonly reported in the literature on rugby injuries, and the current study recorded high rates of ankle ligament, knee ligament and hamstring muscle injuries in males and females. While ATFL injuries were the second most commonly diagnosed injury, ACL injuries carried the highest injury burden for males and females. Previous research has indicated that females are at a higher risk of ACL injury, however similar incidence rates of ACL injury were observed for males and females in the current study (0.8/1 000 player hours and 0.9/1 000 player hours respectively).[2] While the rates of ACL injuries were similar, the severity and subsequent burden of ACL injury differed between males and females, with female players incurring 307.2 days absence per 1 000 player hours compared to males (200.3 days absence per 1 000 player hours).

The physical demands of rugby differ between playing position, with forwards more heavily involved in contact events than backs[22] which may account for the higher rate of injuries sustained by male and female forwards in the current study. Overall, the female inside centres had the highest incidence rates in the women's teams. Previous research has indicated that 'mid-field backs' (the inside and outside centres) make more tackles per match than 'outside backs' (the wingers and fullbacks).[22] The differences in positional demands may be an influential factor in injury occurrence, however in the current study, no significant associations between player position and injury mechanism were found.

There are many limitations to this study. Injury surveillance in amateur sport present additional difficulties compared to professional cohorts, however the IRISweb system was designed specifically for an amateur cohort allowing both 24 hour time-loss injuries and non time-loss injuries to be collected,[34] even where access to medical personnel was limited. Non-medical professionals acting as injury recorders was likely a limitation. However, the ability to record both a 'provisional diagnosis' and 'final diagnosis' allowed time

for the player to seek medical advice outside of the club if no medical professional was available in the club.[34]

Conclusion

Concussion and ankle ligament injuries were the most common injuries in both male and female amateur rugby. In the female cohort, the high rate of non-contact injuries in the second half point to the need for strength and conditioning training programmes to reduce fatigue-related injuries. Investigation into current warm-up practices, load management and pre-season preparation may assist in reducing the number of muscle strains and ligament sprains occurring early in the season. A high rate of fractures and dislocations were also reported early in the season for males and further investigation into the physical demands of match-play may aid the design of appropriate training regimes. Tailoring injury reduction strategies based on differences in positional demands may influence the effectiveness of the strategy.

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